RAPID ASSAY - TOTAL BTEX/TPH
Immunoassay

CYBERSENSE TECHNICAL PRODUCT NOTE CTPN200525 - BTEX

Summary

The BTEX/TPH RaPID assay is a tool for measuring BTEX/TPH in soil and water. The kit applies the principles of enzyme linked immunosorbant assay (ELISA) to determine BTEX/TPH concentration. A BTEX/TPH containing sample is mixed with a BTEX/TPH -enzyme conjugate, which compete for the binding sites of BTEX/TPH specific antibodies attached to paramagnetic beads. A magnetic field separates the antibodies with bound BTEX/TPH or BTEX/TPH -enzyme conjugate from the mixture. Remaining antibody bound enzyme conjugate catalyses a colour reaction directly proportional to enzyme conjugate concentration and inversely proportional to sample BTEX/TPH concentration. The colour change is measured using a spectrophotometer and compared to a three-point calibration curve for quantitation. RaPID Assay hardware can be carried in a plastic briefcase

Analytes

BTEX and TPH

Media

Soil and Water

Selectivity

The assay detects the total BTEX/TPH in a sample and related compounds

Measurement Range

The minimum detection is 0.02 ppm (as total BTEX) but the quantitative measurement range is 0.09-3 ppm for water and 0.9-30 ppm after soil extraction

Susceptibility to Interference

The total BTEX/TPH assay does not differentiate between BTEX and other related compounds. The colour solution is affected by direct sunlight. The recovery from soil samples can be affected by soil type. Water samples must be of a neutral pH

Turnaround Time

1-50 samples in 60 minutes

Applicability

RaPID assay total BTEX test kit is a screening test only, providing quantitative, semi-quantitative and qualitative concentration data for a BTEX and TPH in soil and water, with differing levels of detection for BTEX and other related compounds

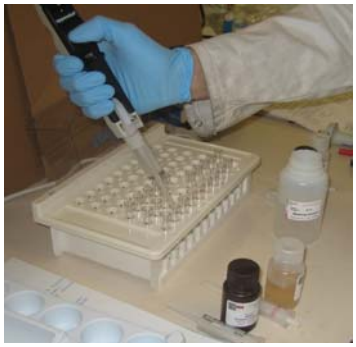
Quantitative Data Capability

To obtain quantitative data, the sample result must fall within the quantitative data range for that media type. The absorption data for Total BTEX/TPH sample is compared with a calibration curve defined by three standard solutions. The concentration is

Contaminant	Water		Soil	
	MDL* (ppm)	LOQ* (ppm)	MDL* (ppm)	LOQ* (ppm)
Total BTEX**	0.02	0.09	0.2	0.9
m-Xylene	0.03	0.25	0.3	2.5
p-Xylene	0.13	0.43	1.3	4.3
o-Xylene	0.22	0.65	2.2	6.5
Ethylbenzene	0.24	1.08	2.4	10.8
Toluene	0.44	1.02	4.4	10.2
Benzene	0.59	7.1	5.9	70.6
TPH				
Naphthlene	0.03	0.082	0.3	0.82
1,2,4-Trimethylbenzene	0.04	0316	0.4	1.6
Anathrazene	0.06	3.88	0.6	38.8
Styrene	0.07	0.36	0.7	3.6
Hexachlorobenzene	0.08	>13.8	0.8	>138
Phenanthrene	0.08	0.22	0.8	2.2
Creosote	0.10	0.66	1.0	6.6
1,3,5-trimethylbenzene	0.14	0.48	1.4	4.8
Acenapthene	0.17	0.86	1.7	85.2
n-propylbenzene	0.27	0.65	2.7	6.5
n-Hexane	2.35	>13.8	23.5	>138
n-Octane	3.40	>13.8	34.0	>138
n-Nonane	4.40	>13.8	44.0	>138
n-Heptane	6.30	9.97	63.0	99.7
Cyclohexane	8.30	>13.8	83.0	>138
n-Decane	13.5	>13.8	135	>138
Methylene chloride	>100	>100	>1000	>1000
Trichloroethylene	>100	>100	>1000	>1000
Mineral Spirits	1.12	3.45	-	-
Household Lubricant	15.8	>13.8	-	-

*Level of quantitation (LOQ) is the minimal level quantifiable data is obtained for a given contaminant. The method detection limit (MDL) is the level at which contamination is detected but quantifiable data cannot be obtained. **Total BTEX is equivalent parts benzene, toluene, ethylbenzene, and Xylene

displayed on a print out from the spectrometer along with the calibration curve data. Dilution calculations are performed to get the concentration of BTEX/TPH in the sample. If the response falls outside the linear range then semi-quantitative data can be obtained as being greater or less than those limits



Technology Status
Commercially available worldwide

Certification/Validation
US EPA approved method 4030. Published in EPA SW-846 test methods